

**Research Progress Report to VDACS
2007**

Project Title: **Optimizing Pepper and Tomatillo Production and Grower Diversification in Virginia**

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Project Description:

Diversification of farm generated income is a simple investment strategy to avoid or minimize economic loss in the case of biotic or abiotic causes of crop loss. The primary challenges to adopting new crops to the farm portfolio are identifying best management and cultural practices for alternative/supplemental crops and marketing strategies. Climatic conditions in Virginia can support a diversity of agricultural products; however, historical production in rural areas has focused on a few crops specifically tobacco, forage crops and tree fruits. Subsequent cultural and marketing support has also been focused in these crop areas.

Results of last year's project, which investigated the viability of specialty vegetable production, demonstrated that production potentials for hot peppers were extremely promising. Research trials conducted at SPAREC and on four farms investigated cultivar differences, plant spacing effects and methyl bromide soil fumigation alternatives to begin to define cultural specifics for successful and profitable production. The main limitation thus far for implementing on-farm production has been the cultural differences between tobacco and vegetables. Row spacing, use of plastic mulch, drip irrigation, pesticide programs and subsequent equipment needs for conventional vegetable culture are very different from the requirements to produce tobacco. Aside from these cultural differences, these vegetables have excelled in this environment and look to have great potential.

Market potentials for the three vegetables proved to be quite different during the 2006 growing season. The demand for habaneros and tomatillos was not as great as for the jalapenos. Discussions with industry buyers and growers highlighted that Jalapenos had the greatest market and cultural potential for Southside and therefore became the focus for the 2007 research trials.

Objectives:

The objectives are to compare cultural variations that accomplish successful/ profitable production of jalapenos while facilitating economical grower adoption.

Methods:

Transplant production-

Seeds of two jalapeno cultivars (Tormenta and Agriset 4108), that had performed exceptionally well in the 2006 trials, were obtained from a commercial seed company and used in the greenhouse and field trials. Transplants were produced at SPAREC using tobacco float bed technology. Treatments within the float bay investigated the effect of plug size (288, 200 and 128 cells per tray; Fig. 1) on transplant production and subsequent field establishment. The typical tray size used in tobacco plug production is the 288 and would be found on most farms that produce transplants and was therefore included as a no cost possibility to the grower. Other vegetable literature suggests that as plug size increases, earliness and total yield are increased. However, the economics of space utilization make large plug sizes unfeasible and the 128 size was selected as the maximum.

Cultural systems-

Three systems were established to investigate the economic impact on production and feasibility of modified production systems to facilitate grower adoption. All plots were planted on June 1, 2007.

1. Conventional vegetable plasticulture
 - a. Wide raised beds covered with black plastic mulch
 - b. Sub-surface drip irrigation
 - c. 60" row centers
 - d. Staggered double plant row (12,000 plants/acre)
 - e. Requires specialized equipment with a high capital investment
2. Modified system 1
 - a. Narrow raised beds with black plastic mulch
 - b. Sub-surface drip irrigation
 - c. 48" row centers
 - d. Single plant row (7,500 plants/acre)
 - e. Utilizes *most* tobacco related farm equipment
3. Modified system 2
 - a. Narrow raised beds *without* black plastic mulch
 - b. Sub-surface drip irrigation
 - c. 48" row centers
 - d. Single plant row (7,500 plants/acre)
 - e. Utilizes *all* tobacco related farm equipment

Initial Observations:

Transplant production-

Utilizing the tobacco float bay system appears to be a viable method for vegetable transplant production. However, jalapenos require a different set of cultural specifications relative to tobacco. We observed that 100 ppm nitrogen fertilization solution was too 'rich' for the peppers and resulted in excessive vigor and stem elongation across all cultivars and tray sizes. This corresponded to increased transplant stress at planting particularly for the 288 cell trays. The 200 and 128 cell trays responded similarly with respect to plant establishment, however, yield and earliness are yet to be determined.

Cultural systems comparison-

A yield advantage for the conventional system is expected as a direct function of plant density per acre; therefore yields will be expressed in pounds per acre as well as pounds per plant.

Both plastic mulch treatments appear to have equal growth responses with respect to initial establishment and plant vigor. Bare ground plots appear to have less vegetative vigor which may translate to lower productivity.

Impacts:

Significant impacts to agriculture can not be made at this early point of the study; however, the objectives are addressing a few of the most significant limitations to diversification of tobacco growers.